

CLAIMS

1. A negative pressure type booster device wherein a booster shell is partitioned by a partition member into a variable pressure chamber and a constant pressure chamber, wherein a valve piston is secured at its base portion to the partition member, wherein an output power of the partition member depending on a pressure difference between the variable pressure chamber and the constant pressure chamber is transmitted from the valve piston to an output rod through a reaction member, wherein a plunger acting in connection with the reaction member and an input rod axially movable by a brake pedal are connected to constitute an input member, wherein a negative pressure valve seat and an atmosphere valve seat are formed respectively on the valve piston and the plunger, wherein a negative pressure valve and an atmosphere valve are provided for being brought respectively into contact with, or separation from, the negative pressure valve seat and the atmosphere valve seat to make the variable pressure chamber communicate with, or blocked from, the constant pressure chamber and the atmosphere, and wherein a silencer is provided for admitting the atmospheric air to the atmosphere valve, characterized in that a secondary passage communicating directly with the atmosphere is formed between an internal surface of a sliding cylindrical portion of the valve piston and an external surface of the silencer for enabling the atmospheric air to be admitted from the secondary passage to the variable pressure chamber when the input member is advanced beyond a predetermined distance relative to the valve piston.

2. The negative pressure type booster device as set forth in Claim 1, characterized in that a cylindrical member having a stepped portion at an intermediate portion thereof is arranged between the internal surface of the sliding cylindrical portion of the valve piston and the external surface of the silencer to constitute a communication passage and that the communication passage is closed by closing means to block the communication with the atmosphere valve seat at the time of an

ordinary braking, but is opened to make the secondary passage communicate with the atmosphere valve seat when the input member is moved beyond the predetermined distance relative to the valve piston.

3. The negative pressure type booster device as set forth in Claim 2, characterized in that the closing means comprises a bypass valve member contactable to the intermediate stepped portion for closing the communication passage and an urging member for urging the bypass valve member in a direction toward contact with the intermediate stepped portion and that an operating portion extending from the input member pushes the bypass valve member forward against the resilient force of the urging member to open the communication passage.

4. The negative pressure type booster device as set forth in Claim 3, characterized in that the operating portion extending from the input member extends in a direction perpendicular to a swing motion direction of the input member given by the brake pedal.

5. The negative pressure type booster device as set forth in any of Claims 2 through 4, characterized in that the cylindrical member is circumferentially positioned relative to the valve piston, that an operating member is provided extending the operating portion, that a position restriction portion is provided for restricting the operating member relative to the cylindrical member in the circumferential direction, and that the operating member has a guide aperture for allowing the input member to swing but restricting the relative movement in a direction perpendicular to the swing motion direction.

6. The negative pressure type booster device as set forth in Claim 5, characterized in that after the input member, the plunger, the negative pressure valve, the atmosphere valve and the like are assembled to the valve piston, the operating member is attached onto the input member to have a rearward position thereof restricted relative to the input member.

7. The negative pressure type booster device as set forth in Claim 1,

characterized in that there are further provided a bypass valve member for opening and closing the secondary passage and an operating member on the input member for making the bypass valve member open when the input member is advanced beyond the predetermined distance relative to the valve piston, that the operating member has a round inner hole which does not interfere with the input member during the swing motion of the same, and that the operating member is guided at opposite ends thereof by a pair of slide guiding members to be radially slidable relative thereto and has its rearward position restricted on the input member.

8. The negative pressure type booster device as set forth in Claim 7 characterized in that the sliding cylindrical portion of the valve piston receives therein a cylindrical member to define the secondary passage between itself and the internal surface of the sliding cylindrical portion, that a communication passage for being opened and closed by the bypass valve member is formed on the cylindrical member, and that the operating member is received within the cylindrical member with a slight clearance in radial directions.

9. The negative pressure type booster device as set forth in Claim 7 or 8, characterized in that the operating member takes the shape protruding a plurality of slide guided portions in radial directions from the circumference thereof to define air passages between these slide guided portions.